

8th Grade

Math Summer Packet

Name: _____

Greetings 8th Grade students,

Welcome to 8th Grade! We are looking forward to learning with you next school year.

In order to be prepared for math class, it is important to review topics from previous mathematics grade levels. The problems in this packet are designed to help you review and maintain the necessary skills to be a successful Algebra student.

Make sure to follow the directions below for the best outcomes:

- 1) Do NOT use a calculator.
- 2) Show all work! An important aspect of mathematics is being able to communicate the process you use to arrive at your answer.
- 3) Be neat and organized! Part of success in math is being able to organize your work.
- 4) Box your final answers.
- 5) Do not rush! Take advantage of the summer pace.

This will be collected within the first week of school.

Have a wonderful summer!
8th Grade Math Teachers

***If you are struggling with any of the skills in this packet, please search for the skill topic on Khan Academy website: <https://www.khanacademy.org/> or the Virtual Nerd website: <http://virtualnerd.com/pre-algebra/all/>. You can also get extra practice on each skill from the IXL website. Ixl.com. You can complete 10 questions a day without a membership.



Order of Operations

To avoid having different results for the same problem, mathematics have agreed on an order of operations when simplifying expressions that contain multiple operations.

- 1) Perform any operation(s) inside grouping symbols such as; parentheses, brackets, or above/below a fraction bar.
- 2) Simplify any term with exponents.
- 3) Multiply or divide from left to right.
- 4) Add or subtract from left to right.

Example 1

$$\begin{aligned}2 - 3^2 + (6 + 3 \cdot 2) \\2 - 3^2 + (6 + 6) \\2 - 3^2 + 12 \\2 - 9 + 12 \\-7 + 12 \\5\end{aligned}$$

Example 2

$$\begin{aligned}-7 + 4 + (2^3 - 8 \div 4) \\-7 + 4 + (8 - 8 \div 4) \\-7 + 4 + (8 - 2) \\-7 + 4 + (6) \\-3 + 6 \\3\end{aligned}$$

Evaluate each expression using order of operations.

$$6 + 4 - 2 \cdot 3$$

$$3(2 + 7) - 9 \cdot 7$$

$$[10 + (2 \cdot 8)] \div 2$$

$$5(14 - 39 \div 3) + 4 \cdot \frac{1}{4}$$

$$10 \cdot (3 - 6^2) + 8 \div 2$$

$$\frac{3[10 - (27 \div 9)]}{4 - 7}$$

Integer Operations

Integers are positive and negatives whole numbers, including zero. It is important to make sure that students entering Algebra can add, subtract, multiply, and divide integers.

Example 1

$$\begin{array}{r} 9 + (-12) \\ -3 \end{array}$$

Example 2

$$\begin{array}{r} -5 + 7 \\ 2 \end{array}$$

Example 3

$$\begin{array}{r} (-5) - 3 \\ -8 \end{array}$$

Example 4

$$\begin{array}{r} 4 - (-3) \\ 4 + 3 \\ 7 \end{array}$$

Example 5

$$\begin{array}{r} (-7)(4) \\ -28 \end{array}$$

Example 6

$$\begin{array}{r} (-9)(-3) \\ 27 \end{array}$$

Simplify each expression.

$$9 + (-4)$$

$$-8 + 7$$

$$-14 - 6$$

$$14 - 20$$

$$1 - (-12)$$

$$-6 - (-7)$$

$$(-5)(-3)$$

$$\frac{-6}{2}$$

$$\frac{-7}{-1}$$

$$(7)(8)$$

$$(-2)(9)$$

$$\frac{20}{5}$$

$$0 - (-4)$$

$$(-5)(-9)$$

$$(9)(0)$$

Rounding Numbers

Rounding is extremely important when we enter exponential functions. Below are the steps in case you forgot how to round numbers.

- 1) Underline the place value in which you want to round.
- 2) Look at the number to the right of that place value you want to round.
- 3) If the number to the right of the place value you want to round is less than 5, keep the number the same and drop all other numbers.
- 4) If the number to the right of the place value you want to round is 5 or more, round up and drop the rest of the numbers.
- 5) If the number you are rounding is 9 and the number to the right is a 5 or more, round the previous place value up. (See example 3)

Example 1: Round to the nearest tenths place.

23.1252

23.1

Example 2: Round to the nearest hundredths place.

64.5782

64.58

Example 3: Round to the nearest hundredths place.

−7.39672

−7.40

Round the following numbers to the nearest **tenths** place.

18.6231

25.0543

3.9215

−36.99245

17.1052

0.67278

0.2658

100.9158

100.99999

Round the following numbers to the nearest **hundredths** place.

18.6231

25.0543

3.9215

−36.99245

17.1052

0.67278

0.2658

100.9158

100.99999

Evaluating Expressions

If you are given an algebraic expression with variables, you should be able to substitute in a value for that variable and evaluate that expression.

Example 1

Evaluate $-7x + 4y - 12$

if $x = -6$ and $y = -1$

$$\begin{aligned} & -7(-6) + 4(-1) - 12 \\ & 42 - 4 - 12 \\ & 38 - 12 \\ & 26 \end{aligned}$$

Example 2

Evaluate $10a - ab + 3b$

if $a = \frac{1}{5}$ and $b = 15$

$$\begin{aligned} & 20\left(\frac{1}{5}\right) - \left(\frac{1}{5}\right)(15) + 3(15) \\ & 4 - 3 + 45 \\ & 1 + 45 \\ & 46 \end{aligned}$$

Evaluate each expression given that $x = 5$, $y = -4$, and $z = 6$.

$$3x$$

$$y + 4$$

$$2x^2$$

$$5x - 6$$

$$3x^2 + y$$

$$xy + z$$

$$2(x + z) - y$$

$$2x + 3y - z$$

Distributive Property

Throughout our Algebra course, it is vital that you know how to distribute. To distribute, you multiply the outside coefficient to all terms inside the parentheses.

Example 1

$$\begin{array}{l} -3(-2x + 5) \\ 6x - 15 \end{array}$$

Example 2

$$\begin{array}{l} 4(5a - 9b) \\ 20a - 36b \end{array}$$

Use the distributive property to write an equivalent expression.

$$-2(n + 7)$$

$$-8(3p - 1)$$

$$7(-3k + 7h)$$

$$2(3a - 4b + 7c)$$

Combining Like Terms

In order to combine like terms, the term must have the same variable and same exponent.

Example 1

$$5x + x - 3$$

Example 2

$$2r + 5 + 3r - 9$$

Combine Like Terms.

$$-2x + 11 + 6x$$

$$9a - 6a + 4b$$

$$-3x + 15x - 9 + 4$$

$$7m - 2n + m - 7n$$